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7590 Martha Ann Finnegan, Esq. Cabot Corporation 157 Concord Road Billerica, MA 01821-7001			EXAMINER YANG, JIE	
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/795,968
Filing Date: March 08, 2004
Appellant(s): HABECKER ET AL.

Luke A. Kilyk
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/24/2008 appealing from the Office action mailed 7/9/2008.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,448,447	Chang	9-1995
6,786,951 B2	He et al	9-2004
WO 98/37248	Reichert	8-1998
6,193,779- Corresponding to WO 98/37248	Reichert	2-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

Claims 36-43, 50-56, 58, 61 and 65 are rejected under 35 U.S.C. 102(b) as anticipated by Chang (US patent 5,448,447, Hereafter US'447), or in the alternative, under 35 U.S.C. 102(b) as anticipated by US'447 as evidenced by He et al (US, 6,786,951 B2, thereafter US'951).

Regarding claim 36, US'447 teaches capacitor grade powder from base material selected from Group V-B of the periodic table which has been reacted with nitrogen and oxygen (Col.1, lines 8-16 of US'447). US'447 further discloses that: "...capacitor powder

for low leakage capacitors is produced from base materials which contain at least one metal powder selected from Group V-B of the Periodic Table. For simplicity purposes, reference shall be made to tantalum metal hereafter even though the chemical and physical properties of tantalum and niobium are known by those skilled in the art to be sufficiently similar to permit substitution of either metal." (Col.3, lines 60-68 of US'447). Therefore, US'447 discloses the use of niobium in the invention. Regarding the limitations of sintering temperature of 1100°C and formation voltage of 20 Vf, which are recognized as process limitations in product claim. Claim 36 is a product by process claim and there is no evidence that the claimed process limitation would render the claimed product unobvious over the niobium powder of US'447. See MPEP 2113.

Regarding "agglomerated" limitation in claim 36, US'447 teaches the powder may be agglomerated by heat treatment and crushed to a certain particle size (Col. 1, line 61 to Col.2, line 8 and col.4, lines 1-18 of US'447). Therefore, US'447 anticipates the instant claim.

Alternately, US'447 teaches the chemical and physical properties of tantalum and niobium are known by those skilled in the art to be sufficiently similar to permit substitution of either metal (Col.3, lines 60-68 of US'447), which is further

evidenced by US'951. US'951 teaches a high surface area tantalum and/or niobium powders via the reduction of the corresponding tantalum and/or niobium oxides for electrolytic capacitors application (Abstract of US'951). Under the similar treatment conditions (Examples 1-6 of US'951), the Ta and Nb powders have shown the similar electrical properties (refer to table 6-7 of US'951). See MPEP 2112 I&II. Therefore, it would have been obvious to one skilled in the art to use high surface area niobium powders via the reduction of the corresponding tantalum or niobium oxides as demonstrated by US'951 for the US'447's niobium powder in order to apply electrolytic capacitors (Abstract of US'951).

Regarding claims 37-42, which are directed to the characteristics of the powder post-sintering, because US'447 teaches the same sintered niobium flaked powder as recited in the instant invention, the post-sintering properties, for example, the capacitance (claims 37-41) and DC leakage (claim 42) would be inherent. MPEP 2112 III&IV. Alternatively, this position is further evidenced by US'951 which teaches the anode made from niobium powder having a similar range of capacitance and DC leakage as recited in the instant claims.

Regarding claim 43, US'447 teaches the powder may be in flaked form (Col.4, lines 11-18 of US'447), which reads on the limitation of the instant claim.

Regarding claims 50-53, US'447 teaches about 1850 to 2550ppm of nitrogen in the powder (Col.5, lines 16-23 of US'447), which reads on the limitations: powder is nitrogen doped (claim 50); at least about 100ppm of nitrogen present (claim 51); and from about 100ppm to 5,000ppm of nitrogen present (claim 52).

Claims 53 and 54 are directed at the powder flow rate, which is inherently met by the flake morphology as disclosed by US'447 unless a showing is proved to overcome this assertion.

Claims 55 and 56 are directed to the density of the powder, which the Examiner finds to be inherently met by a powder produced by a process of similar processing conditions unless a showing is provided to overcome this assertion.

Claim 58 is directed to an aspect ratio limitation which is inherently met by a flake morphology powder produced by the similar processing conditions unless a showing is provided to overcome this assertion.

Claim 61 is found as a combination of limitations of claims 54 and 56.

Regarding claim 65, which differs from claim 36 in that claim 65 recites a formation voltage of 35Vf as opposed to 20Vf. Although US'447 does not recite that an electrode is formed by sintering at a temperature of 1100°C and anodized using a formation voltage of 35Vf, however, the properties of capacitance of at least 65,000 CV/g and DC leakage of less than 5.0nA/CV would be expected from the powder of US'447 subjected to these conditions, since US'447 discloses the use of niobium capacitor powder for low leakage capacitors (Col.3, lines 60-68 of US'447). Alternatively, this position is further evidenced by US'951 which teaches the anode made from niobium powder having a similar range of capacitance and DC leakage as recited in the instant claims.

Claim Rejections - 35 USC § 103

Claims 48, 49, 57 and 62-64 are rejected under 35 U.S.C. 103 (a) as being unpatentable over US'447 as evidenced by US'951.

Regarding claims 48 and 49, US'447 discloses that the oxygen content is 700 to 3000ppm (Col.2, lines 60-68), which overlaps the claimed ranges of less than 1,000ppm (claim 48) and between about 2,000ppm to about 60,000ppm (claim 49). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form between 700 to 1,000ppm

oxygen or between 2,000 and 3,000ppm oxygen, since US'447 discloses equal utility for the range of between 700 and 3,000ppm (See MPEP 2144.05).

Regarding claims 57 and 62-64, US'447 is silent as to the range of particle size, but discloses particle size of less than -40 mesh and gives an example of unagglomerated powder of 1 μ m (see example 8). It would have been obvious to one having ordinary skill in the art to select any portion of the range, including the claimed range, from the broader range disclosed in the prior art, because the US'447 teaches that said composition in the entire disclosed range has a suitable utility. Overlapping range has been held to be a prima facie case of obviousness, see MPEP 2144.05.

Claims 36-47, 49-58, and 61-65 are rejected under 103 (a) as being unpatentable over WO 98/37248 (WO'248, Corresponding U.S. Patent No. 6,193,779) in view of US'447, and further in view of US'951.

Claims 36 and 65 are product by process claims and as such is not limited by or defined by the process disclosed. The patentability does not depend on the method of the production, but rather on the product itself. If the product-by-process claim is the same as or obvious from a product of the prior art,

the claim is unpatentable even though the prior product was made using a different process (See MPEP 2113).

WO'248 discloses a tantalum powder which after sintering at a temperature of between 1100 and 1300°C and forming at 16 volts has a specific charge of 120,000 to 1,800,000 μ FV/g at a leakage current of less than 2nA/ μ FV (claim 7 of WO'248, based on corresponding US Patent: Reichert et al. (US 6,193,779) and PCT publication date of 27 Aug. 1998—noticed by the Examiner). The range of 120,000 to 1,800,000 μ FV/g is within the claimed ranges of at least 65,000 CV/g (claims 36 and 65) and overlaps the claimed ranges of from 65,000 to 150000CV/g (claim 37); from 75,000 to 175,000CV/g (claim 38); from 100,000 to 250,000CV/g (claim 39); from 125,000 to 250,000 CV/g (claim 40); and from 100,000 to 210,000CV/g (claim 41) (The Appellant has defined CV/g as microfarad volts per gram in the specification—noticed by the Examiner).

WO'248 does not specify that the powder is niobium.

US'447 discloses a process for making improved tantalum powder into high capacitance, low leakage electrodes (Abstract of US'447). The purity of the starting material and processing steps for making the electrodes are the same or similar in US'447 as in WO'248. US'447 discloses that the chemical and

physical properties of tantalum and niobium are known by those skilled in the art to be sufficiently similar to permit substitution of either metal (Col.3, lines 60-68 of US'447). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use niobium as taught by US'447 in the sintered, anodized powder electrodes disclosed by WO'248, since US'447 discloses that the chemical and physical properties of tantalum and niobium are known by those skilled in the art to be sufficiently similar to permit substitution. Therefore, in the absence of evidence to the contrary, one skilled in the art would expect the properties of niobium powder processed by the method disclosed in WO'248 to possess the same or similar characteristics as the tantalum powder claimed in WO'248 in view of US'447. This position is further evidenced by US'951. US'951 teaches a high surface area tantalum and/or niobium powders via the reduction of the corresponding tantalum and/or niobium oxides for electrolytic capacitors application (Abstract of US'951). Under the similar treatment conditions (Examples 1-6 of US'951), the Ta and Nb powders have shown the similar electrical properties (refer to table 6-7 of US'951). See MPEP 2112 I&II.

Regarding claim 42, WO'248 discloses a range of leakage current of less than $2\text{nA}/\mu\text{FV}$ (claim 7 of WO'248), which overlaps the claimed range of from about $0.5\text{nA}/\text{CV}$ to $5.0\text{nA}/\text{CV}$.

Regarding claim 43, the powder disclosed by WO'248 would be flaked since it is produced by crushing and sieving (Col.2, lines 35-44).

Regarding claim 44-47, WO'248 discloses that after washing and during, the BET surface are between 1.5 and $10\text{m}^2/\text{g}$ (Col.2, lines 40-44), which overlaps the claimed ranges of at least about $5.5\text{m}^2/\text{g}$ (claim 44); at least about $7\text{m}^2/\text{g}$ (claim 45); at least about $10\text{m}^2/\text{g}$ (claim 46); or from 6.0 - $12\text{m}^2/\text{g}$ (claim 47).

Regarding claim 49, WO'248 discloses that the oxygen content is between $4,000$ to $20,000\text{ppm}$, which is within the claimed range of about $2,000\text{ppm}$ to about $60,000\text{ppm}$.

Regarding claim 50-52, WO'248 discloses that the nitrogen content is between 100 to $15,000\text{ppm}$, preferably at least 500ppm (Col.3, lines 50-55), which is within the claimed range of at least 100ppm (claim 51) and overlaps the claimed range of from 100 to $5,000\text{ppm}$ (claim 52).

Regarding claims 53-54, WO'248 discloses that the powder typically have a flow of 100 to 140 seconds through a 0.1 inch funnel and 15 - 25 second through a 0.2 inch funnel (Col.3, lines 25-35), which one of ordinary skill in the art would expect to

mean the flow of 50 grams of powder, since WO'248 cites ASTM-B-213. These report rates through a 0.1 inch funnel would then correspond to 500 and 357mg/s respectively, which are within the ranges of at least about 80mg/s (claim 53) and from 80-500mg/s (claim 54).

Regarding claims 55, 56, and 61, in absence of evidence to the contrary the Scott density of the powder would be expected to be about 35g/in^3 or less or between about 10 and 35 g/in^3 since WO'248 discloses an example (example 5) wherein the Scott powder density of tantalum powder produced by this method was 19.4g/in^3 and since the atomic mass of niobium is a little more than half that of tantalum.

Regarding claims 57 and 62, WO'248 discloses that preferred size obtained by sintering is greater than $13\mu\text{m}$ (Col.3, lines 15-22), which overlaps the claimed range of from 5 to $80\mu\text{m}$ as recited in the instant claim.

Regarding claims 58 and 63, while WO'248 does not specify that the aspect ratio is from about 3 to 300, such would be expected in the absence of evidence to the contrary from a powder of the same or similar composition made by the same or similar method, since when prior art teaches the identical

chemical structure, the properties applicant discloses and/or claims are necessarily present (See MPEP 2112.01 II).

Regarding claims 59, 60, and 64, WO'248 discloses agglomerated powder (Col.2, lines 27-44).

(10) Response to Argument

With respect to the Declarations under 37 C.F.R. 131 and 132 filed on 02/24/2006 ("the 2006 Enman Declaration"), which has provided results for testing a niobium powder of BET around $0.58\text{m}^2/\text{g}$. The data was collected from sintering at 1300°C and is extrapolated to represent an estimated capacitance for a sintering temperature of 1100°C . The 1.132 declaration does not address the difference between the applied formation voltage (35V), and the limitation for applied voltage as recited in the instant claim 36 (i.e. 20V). Although this difference is characterized as not significant in the argument, however, arguments do not take the place of the evidence. Therefore, it is not sufficient to overcome the rejection.

With respect to the Declarations under 37 C.F.R. 131 and 132 filed on 04/30/2007 ("the 2007 Kimmel Declaration"), it is not sufficient to overcome the rejection. This declaration appears to cite the difference between niobium and tantalum as evidence that they were not considered substitutes for each other in the field of electrode capacitors prior to the invention disclosed by application 09/632,714. Mr. Kimmel has stated the opinion based on knowledge in the area that niobium can not simply be substituted for tantalum especially in the electrode capacitor area. However,

the teaching of substitution of niobium for tantalum in the ground of rejection for the instant application is not a proposal of the Examiner but is taught by the prior art. See: a) Col.3, lines 60-68 of US'447; b) He et al (US'951) applied as an evidence reference, which teaches a high surface area tantalum and/or niobium powders via the reduction of the corresponding tantalum and/or niobium oxides for electrolytic capacitors application (Abstract of US'951). Under the similar treatment conditions (Examples 1-6 of US'951), the Ta and Nb powders have been shown a similar electrical properties (refer to table 6-7 of US'951). The declaration presents the results of estimates from test conditions other than recited in the instant claims. The Examiner's position is that in order to show that the niobium powder disclosed in the prior art would not have the same characteristics as the claimed powder after sintering at 1100°C for 10 minutes and anodizing using a formation voltage of 20Vf at 60°C (claim 36) or 35Vf at 60°C (claim 65), then the powder disclosed in the prior art must be test at these conditions. Instant claims 35 and 65 recite powder characteristics after sintering at 1100°C, however the data presented in the Declaration is for powder sintered at 1300°C. Data was extrapolated from 1300°C to 1100°C, presumably by the method discussed in the 02/24/2006 Declaration (extending a line beyond two data points collected respectively at 1300°C and 1400°C). Examiner's position is that this is an estimate as opposed to evidence (e.g. test results using the claimed conditions). Further extrapolation was made to estimate results at a forming voltage of 20 volts (whereas 25V, 30V, and 35V were tested). Although it is argued that it is reasonable to use linear extrapolation, no basis is presented for why this is reasonable, and it is not evidence to the Examiner

given only two data points to extrapolate temperature and three data points to extrapolate formation voltage. Conclusory statements are then made regarding the possible results if tantalum were formed using this temperature and voltage, however conclusory statement do not take the place of evidence.

Appellant's arguments filed on 3/28/2008 with respect to claims 36-58, and 61-65 have been fully considered but they are not persuasive.

Appellant's arguments are summarized as follows:

1, Chang (US'447) fails to disclose agglomerated niobium powder as arranged as required in claim 36 or any claims dependent thereon because there is no specific single teaching or example in Chang (US'447) of agglomerated and niobium powders in combination; it is noted that the Chang (US'447) passage does not state that the tantalum and niobium have "similar" electrical properties; and the very description relied upon by the Examiner for agglomerated powders is a different powder than the material described in Chang and for which the Examiner is basing the rejection upon.

2, He et al ((US, 6,786,951 B2, thereafter US'951) is not prior art to the present application and it can not be an inherent prior art either because it requires that the characteristic is a "necessary feature or result of a prior-art embodiment" that is sufficiently described and enabled.

3, Regarding claims 38-41, which depend on claim 36, the reasons for reversal with respect to the rejection of patent claim 36 apply equally to claims 38-41. In addition, the "2006 Enman Declaration" (It should be 2006 instead 2007 as stated in the instant

appeal brief page 25, line 12) supports the Appellant's argument. He et al (US'951) cannot be used to modify the primary reference as an "evidence reference"

4, Regarding Independent claim, which has the same language as claim 36, but recites a formation voltage of 35Vf. The reasons for reversal with respect to the rejection of patent claim 36 apply equally to here. In addition, the "2006 Enman Declaration" supports the Appellant's argument. He et al (US'951) cannot be used to modify the primary reference as an "evidence reference"

5, Regarding the rejection of claims 48, 49, 57, and 62-64 under 35 U.S.C. 103 (a) as being unpatentable over Chang (US'447) and in view of He et al (US'951), claims 48, 49, 57, and 62-64 depend on claim 36. The reasons for reversal with respect to the rejection of patent claim 36 apply equally to here. In addition, the appellants submit that the Examiner, in making this obviousness rejection of claims 48, 49, and 62-64 based on Chang (US'447), has not considered the entire teaching of the reference, including those portions that would lead away from the claimed invention. Further, He et al is not prior art to the claimed invention. Still regarding claim 57, Chang (US'447) only provides limited information on powder sizes.

6, Regarding rejection of claims 36-47, 49-58, and 61-65 under 35 U.S.C. 103 (a) as being unpatentable over WO 98/37248 (WO'248) in view of US'447 and further in view of US'951, the Examiner does acknowledge that WO'248 does not teach or suggest that the powder is niobium, but the Examiner asserts that it would be obvious to use niobium in the sintered anodized powder electrodes disclosed by WO'248 in view of Chang (US'447), and further evidenced by He et al(US'951). Chang (US'447) does not

state that electrical characteristics are interchangeable with the niobium and tantalum powders, nor does WO'248. The surface area of US'447's powder and WO'248's powder are completely different. One skilled in niobium powder would not look to the alleged high capacitance tantalum powder set forth in WO'248 to develop niobium powders.

Responses are as follows:

Regarding argument 1, as pointed out in the rejection for the instant claims as stated above, Chang (US'477) clearly teaches the powder may be agglomerated by heat treatment and crushed to a certain particle size (Col. 1, line 61 to Col.2, line 8 and col.4, lines 1-28 of US'447). Chang (US'477) teaches: "The base materials employed in one embodiment of the present invention were agglomerated by heat treatment while being subject to a vacuum or an inert gas environment. Temperatures in the range of 1200.degree. C. to 1600.degree. C., and preferably in the range of 1400.degree. C. to 1500.degree. C. were used. The heat treatment process may be repeated to achieve a desired degree of agglomeration. Those skilled in the art will recognize the thermal conditions and heating times necessary to achieve a desired level of agglomeration of the selected powder." (col.4, lines 19-28 of US'447). Chang (US'477) discloses that chemical and physical properties of tantalum and niobium are known by those skilled in the art to be sufficiently similar to permit substitution of either metal (Col.3, lines 60-68 of US'477) and it is common knowledge that the electrical property may be recognized as one of chemical and/or physical properties of the materials.

Regarding argument 2, the Examiner disagrees with the Appellants' argument. As discussed, US'951 (He et al) is used as a further evidence reference. US'477 (Chang) teaches: "According to one embodiment of the present invention, capacitor powder for low leakage capacitors is produced from base materials which contain at least one metal powder selected from Group V-B of the Periodic Table. For simplicity purposes, reference shall be made to tantalum metal hereafter even though the chemical and physical properties of tantalum and niobium are known by those skilled in the art to be sufficiently similar to permit substitution of either metal." (Col.3, lines 60-68 of US'951), which clearly support the Examiner's position that Chang (US'477) teaches the niobium powder. As discussed above, He et al (US'951) teaches a high surface area tantalum and/or niobium powders via the reduction of the corresponding tantalum and/or niobium oxides for electrolytic capacitors application (Abstract of US'951). Under the similar treatment conditions (Examples 1-6 of US'951), the Ta and Nb powders have shown the similar electrical properties (refer to table 6-7 of US'951). See MPEP 2112 I&II. The Applicants' argument does not show unexpected different results between Ta and Nb powders. Therefore, Chang (US'447), or in the alternative, Chang (US'477) in view of He et al (US'951) is applied to the claims 36-43, 50-56, 58, 61 and 65 are proper.

Regarding 3-6, the reasons for rejection with respect to the instant claim 36 apply equally to here (refer to the response for the arguments 1-2 as above). The 132 declarations as mentioned in the arguments can refer to the discussions above, which are not sufficient to overcome the rejection.

Still regarding argument 5, the appellants argue that Chang (US'477) does not suggest any lower sintering temperature, anodization voltage, or lower formation voltage and even led away from the claimed invention. However these are process limitations in a product claim. See MPEP 2113.

Still regarding argument 6, WO'248 discloses producing capacitors from tantalum powder having BET surface area essentially as claimed in the instant invention. Chang (US'447) teaches that niobium is a substitute for tantalum in the same field of endeavor. US'477 (Chang) discloses that chemical and physical properties of tantalum and niobium are known by those skilled in the art to be sufficiently similar to permit substitution of either metal (Col.3, lines 60-68 of US'477) and it is common knowledge that the electrical property may be recognized as one of chemical and/or physical properties of materials. As discussed in the response for argument 2, HE et al (US'951) is used as a further evidence reference. He et al (US'951) teaches Ta and Nb powders produced by the similar process have the similar electrical properties, which are suitable for capacitor applications (Refer to table 6-7 of US'951 and the rejections for the independent claims 36 and 65 as discussed above).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Jie Yang/

Jie Yang, Art Unit 1793

Conferees:

/Roy King/

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/Gregory L Mills/

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